Claims:

1. A method, comprising:

dividing a color digital image from an image sensor into a plurality of blocks;

calculating a correlation (Cor) matrix of RGB channels of said image sensor;

estimating a correlation matrix (Cor_{NN}) for an image sensor noise;

calculating a color conversion matrix using Cor and Cor_{NN}, as in $C_{NEW} = C_{NOMINAL}(Cor - Cor_{NN})^T(Cor^{-1})^T$, where $C_{NOMINAL}$ is a second color conversion matrix calculated for the whole picture image; and

applying said color conversion matrix C_{NEW} to all pixels in a block, block by block.

2. The method of claim 1, wherein:

the step of dividing is such that said color digital image is divided into a plurality of non-overlapping NxM blocks that are each at least large enough to yield second order statistics of image signals.

3. The method of claim 1, wherein:

the step of estimating is such that the correlation matrix (Cor_{NN}) of the image sensor noise comprises a sum of the fixed pattern noise, shot noise and readout noise, wherein a variance of said fixed pattern noise and shot noise for each RGB channel depends on light intensity and is estimated from the average RGB values in a particular block.

4. The method of claim 1, wherein:

the step of the calculating is such that Cor is a first correlation matrix based on said pixel values in each respective pixel group, and Cor_{NN} is a second correlation matrix based on the estimated noise of said pixel values in each respective pixel group.

5. The method of claim 1, further comprising:

converting more than three color channels each with different noise statistics into a standard color space by adaptively weighing and choosing a color channel that results in minimum noise with a color-conversion matrix.

6. The method of claim 1, wherein:

the step of dividing is such that said pixels are grouped according to their having similar statistics.

7. The method of claim 1, wherein:

the step of dividing is such that said pixels are grouped according to their having similar colors using clustering or vector quantization processes to calculate the color-conversion matrix for that block.

8. The method of claim 1, wherein:

the step of calculating a color conversion matrix is such that C_{NEW} is calculated via a numerical method such as conjugate gradient or steepest descent method where a starting point for C_{NEW} is $C_{NOMINAL}$ or the C_{NEW} matrix of an adjacent block.

9. A method of color converting a digital color picture image made up of pixels, comprising:

dividing the picture area of said color picture image into a plurality of smaller pixel areas, each pixel having a plurality of pixel values each corresponding to a different color channel; and

processing said pixel values for each respective pixel in each respective pixel group, using a first color conversion matrix, said first color conversion matrix being based on said pixel values in each respective pixel group.

10. The method of claim 9, wherein:

said first color conversion matrix is calculated by

$$C_{NEW} = C_{NOMINAL}(Cor - Cor_{NN})^T (Cor^{-1})^T$$

where $C_{NOMINAL}$ is a second color conversion matrix calculated for the whole picture image, Cor is a first correlation matrix based on said pixel values in each respective pixel group and Cor_{NN} is a second correlation matrix based on the estimated noise of said pixel values in each respective pixel group.

11. The method of claim 10, wherein:

each pixel in a pixel group, prior to processing, has a first pixel value corresponding to the color channel red (R_{raw}), a second pixel value corresponding to the color channel green (G_{raw}) and a third pixel value corresponding to the color channel blue (B_{raw}).

12. The method of claim 10, wherein:

each pixel in a pixel group has four pixel values corresponding to the color channels cyan, magenta, yellow and white.

13. The method of claim 11, wherein:

said first color correlation matrix (Cor) is

$$Cor = \frac{1}{N}\begin{bmatrix} \sum_{i=1}^{N} R_{raw}(i).R_{raw}(i) & \sum_{i=1}^{N} R_{raw}(i).G_{raw}(i) & \sum_{i=1}^{N} R_{raw}(i).B_{raw}(i) \\ \sum_{i=1}^{N} R_{raw}(i).G_{raw}(i) & \sum_{i=1}^{N} G_{raw}(i).G_{raw}(i) & \sum_{i=1}^{N} G_{raw}(i).B_{raw}(i) \\ \sum_{i=1}^{N} R_{raw}(i).B_{raw}(i) & \sum_{i=1}^{N} G_{raw}(i).B_{raw}(i) & \sum_{i=1}^{N} B_{raw}(i).B_{raw}(i) \end{bmatrix}$$

where i is the pixel position in said pixel group, and N is the total number of pixels in said pixel group.

14. The method of claim 11, wherein:

said second correlation matrix (Cor_{NN}) is

$$Cor_{NN} = \begin{bmatrix} \sigma_R^2 & 0 & 0 \\ 0 & \sigma_G^2 & 0 \\ 0 & 0 & \sigma_B^2 \end{bmatrix}$$

where, for said pixel group, $\bullet_R$ is the estimated standard deviation of noise in the red color channel, $\bullet_G$ is the estimated standard deviation of noise in the green color channel, and $\bullet_B$ is the estimated standard deviation of noise in the blue color channel.

15. The method of claim 11, wherein:

said second color conversion matrix $C_{NOMINAL}$ is calculated by minimizing the sum of a squared-difference between a spectral sensitivity function of the color-converted spaces and a standard color space.

16. The method of claim 11, wherein:

each pixel in a pixel group, prior to processing, has a first pixel value corresponding to the color channel red (R_{raw}), a second pixel value corresponding to the color channel green (G_{raw}) and a third pixel value corresponding to the color channel blue (B_{raw}).

17. The method of claim 11, wherein:

each pixel in a pixel group has four pixel values corresponding to the color channels cyan, magenta, yellow and white.

18. The method of claim 11, wherein:

said first color correlation matrix (Cor) is

$$Cor = \frac{1}{N}\begin{bmatrix} \sum_{i=1}^{N} R_{raw}(i).R_{raw}(i) & \sum_{i=1}^{N} R_{raw}(i).G_{raw}(i) & \sum_{i=1}^{N} R_{raw}(i).B_{raw}(i) \\ \sum_{i=1}^{N} R_{raw}(i).G_{raw}(i) & \sum_{i=1}^{N} G_{raw}(i).G_{raw}(i) & \sum_{i=1}^{N} G_{raw}(i).B_{raw}(i) \\ \sum_{i=1}^{N} R_{raw}(i).B_{raw}(i) & \sum_{i=1}^{N} G_{raw}(i).B_{raw}(i) & \sum_{i=1}^{N} B_{raw}(i).B_{raw}(i) \end{bmatrix}$$

where i is the pixel position in said pixel group, and N is the total number of pixels in said pixel group.

19. The method of claim 16, wherein:

said second correlation matrix (Cor_{NN}) is

$$Cor_{NN} = \begin{bmatrix} \sigma_R^2 & 0 & 0 \\ 0 & \sigma_G^2 & 0 \\ 0 & 0 & \sigma_B^2 \end{bmatrix}$$

where, for said pixel group, $\bullet_R$ is the estimated standard deviation of noise in the red color channel, $\bullet_G$ is the estimated standard deviation of noise in the green color channel, and $\bullet_B$ is the estimated standard deviation of noise in the blue color channel.

20. The method of claim 16, wherein:

said second color conversion matrix $C_{NOMINAL}$ is calculated minimizing the sum of a squared-difference between a spectral sensitivity function of the color-converted spaces and a standard color space.